MSc DEGREE END SEMESTER EXAMINATION- NOVEMBER 2017 SEMESTER 1 : CHEMISTRY / PHARMACEUTICAL CHEMISTRY

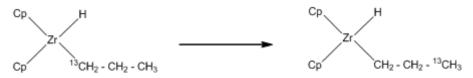
COURSE: 16P1CHET01 / 16P1CPHT01 - INORGANIC CHEMISTRY - I

(Common for Regular - 2017 / Supplementary - 2016 Admissions)

Time: Three Hours Max. Marks: 75

Section A Answer any 10 (2 marks each)

- 1. What are ionization counters?
- 2. How many alpha and beta particles are emitted in Thorium series?
- 3. What were the expectations of Fermi when he bombarded uranium compounds with slow neutrons?
- 4. Which is the major photosynthetic pigment in plants? Give its structure.
- 5. Simple heme units cannot act as oxygen carriers. Why?
- 6. Give the structural features and function of Ferritin.
- 7. Why Co-based macrocyclic complex is well suited for radical-based rearrangements rather than Fe-complex like haem?
- 8. Give a schematic representation of synergic bonding in metal carbonyls.
- 9. What is Vaska's compound? It undergoes addition reaction with H₂ readily. Why?
- 10. Comment on the stability of potassium pentacyanocobaltate(II) complex
- 11. Differentiate between insertion and extrusion reactions with suitable examples.
- 12. What is platinum POP? Give its structure.
- 13. Write a suitable mechanism for the following transformation.



(Cp = Cyclopentadienyl Group

 $(2 \times 10 = 20)$

Section B Answer any 5 (5 marks each)

- 14. Explain about the different techniques used in nuclear waste management.
- 15. Explain the technique Neutron activation analysis based on radioactivity.
- 16. Briefly explain the mode of transport and storage of iron in living organism.
- 17. Discuss the mechanism of action of cis-platin as anti cancer drug.
- 18. Calculate the TEC, PEC and predict the structures of a) $Ru_5(CO)_{16}C$ b) $[Os_5(CO)_{15}]^{2-}$

- 19. Explain the bonding in π -metal olefins.
- 20. Write a note on substitution reactions in organometallic complexes. Differentiate between associative and dissociative substitution reactions.
- 21. Write a note on fluxionality. How NMR spectroscopy is useful to study the fluxionality in compounds with acyclic alkenes.

 $(5 \times 5 = 25)$

Section C Answer any 2 (15 marks each)

- 22. Explain in detail the different modes of radioactive decay by giving suitable examples.
- 23. Briefly discuss the important functions and mechanism of action of a. Vitamin B_{12} . b. Cytochrome P_{450} c. Carbonic anhydrase. $(5 \times 3 = 15 \text{ marks})$
- 24. What are LNCCs and HNCCs? Discuss the polyhedral skeletal electron pair approach (Mingo's rules). Find out the total electron count, polyhedral electron count and predict the structures of $[Os_5 (CO)_{15}]^{2-}$ and $Ru_5C (CO)_{16}$.
- 25. Explain the mechanism of Wacker process using catalytic cycle. Mention its rate expression and give evidences for the mechanism.

 $(15 \times 2 = 30)$